

Material Examined: 1 ♀, 5 ♂, Kashmir, Kupwara, Handwara on *Oryza sativa*, 13.ix.2006 (Shabir A. Reshi); 5 ♀, 9 ♂, Srinagar, Shalimar on *Oryza sativa*, 17.ix.2006 (Shabir A. Reshi).

Remarks: This subspecies has been recorded for the first time from Kashmir

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13. A PRELIMINARY NOTE ON THE MARINE AND ESTUARINE MOLLUSCS IN AND AROUND BAHUDA ESTUARY, ORISSA, EAST COAST OF INDIA

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Marine molluscs of India were well-surveyed right from Preston (1910) to Subba Rao (2003). State-wise series of fauna brought out by Zoological Survey of India also include marine molluscs. Relevant publications also contain systematic works on marine molluscs of Orissa. However, contributions to estuarine molluscs from different estuaries of the state are restricted to Mahanadi (Subba Rao 1968; Subba Rao and Mookherjee 1975; Surya Rao and Maitra 1998) and Rushikulya (Rama Rao *et al.* 1992). Therefore, it was felt necessary to gather information on the molluscs occurring in and around Bahuda, another important estuary in Orissa. The results are presented in this communication.

Bahuda estuary (19° 05' N; 84° 44' E) (Fig. 1) is a minor estuary situated extreme south of Orissa, originates from the Eastern Ghats, meanders through several valleys / plains and finally empties into a shallow lagoon that opens into the Bay of Bengal through a channel of about 5 km length and 250 m width. While the banks of the estuary are sandy, those of the lagoon are muddy with no natural hard substratum around. Of course, some concrete jetties were constructed along the channel that joins the Bay.

Random samples were collected every month from the river mouth and the intertidal zone along the shore in estuarine vicinities, during low tide from January to December 2005.

A quadrate frame of 1 sq. m was placed over randomly selected sampling location; sediment up to 10 cm depth was collected and wet sieved with 0.5 mm mesh. Attached forms were removed from the jetties with the help of scalpel, chisel and hammer. All molluscs collected were initially fixed in 5% neutral formalin, later preserved in glycerin ethyl alcohol mixture (1:19) (Gosner 1971). The specimens were subsequently identified up to species level following standard literature (Mookherjee 1985; Subba Rao and Dey 1986; Subba Rao *et al.* 1991, 1992, 1995; Subba Rao and Surya Rao 1993).

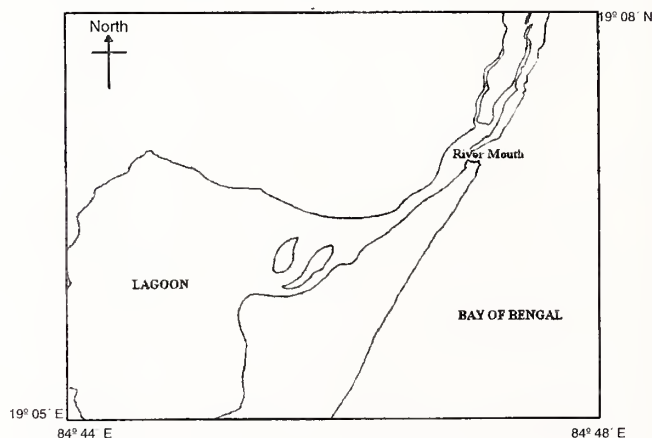


Fig. 1: Map of Bahuda Estuary

During the present investigation, 27 species of molluscs (18 gastropods and 9 bivalves) were collected (Table 1). The 18 gastropod species were represented by 16 genera belonging to 13 families falling under 3 orders, whereas the 9 bivalves were represented by 8 genera belonging to 7 families falling under 4 orders. Of these, the species, namely *Crassostrea cuttackensis* (Newton and Smith, 1912), *Cerithidea (Cerithideopsilla) cingulata* (Gmelin, 1791), *Telescopium telescopium* (Linnaeus, 1758), *Oliva oliva* (Linnaeus, 1758), *Bullia vittata* (Linnaeus, 1767), *Meretrix meretrix* (Linnaeus, 1758), *Anadara granosa* (Linnaeus, 1758), *A. rhombea* (Born, 1780) and *Siliqua radiata* (Linnaeus, 1758) were common and abundant. However, *Crassostrea cuttackensis* (Newton and Smith, 1912), *Cerithidea (Cerithideopsilla) cingulata* (Gmelin, 1791) and *Telescopium telescopium* (Linnaeus, 1758) were most dominant.

Among the 48 species reported by Rama Rao *et al.* (1992) from Rushikulya estuary, only 13 species, namely *Cerithidea (Cerithideopsilla) cingulata* (Gmelin, 1791), *Telescopium telescopium*, *Natica gualteriana* Recluz, 1844, *Murex tribulus* (Linnaeus, 1758), *Babylonia spirata* (Linnaeus, 1758), *Oliva oliva* (Linnaeus, 1758), *Anadara granosa* (Linnaeus, 1758), *A. rhombea* (Born, 1780), *Perna*

viridis (Linnaeus, 1758), *Crassostrea cuttackensis* (Newton and Smith, 1912), *Donax (Hecuba) scortum* (Linnaeus, 1758), *Sunetta scripta* (Linnaeus, 1758) and *Meretrix meretrix* (Linnaeus, 1758) were common to Bahuda estuary. Surya Rao and Maitra (1998) had listed 149 species of molluscs from Mahanadi estuary. Except *Natica gualteriana* Recluz, 1844, *Ficus gracilis* (Sowerby, 1825), *Murex tribulus* (Linnaeus, 1758), *Conus inscriptus* Reeve, 1843 and *Terebra commaculata* (Gmelin, 1791), all the species reported during the present study were common to Mahanadi estuary. However, all the molluscs encountered during the present study were recorded earlier from Orissa except *Terebra commaculata* (Gmelin, 1791) which forms a new record both for Bahuda estuary, as well as Orissa.

Thus, the molluscan diversity in Bahuda estuary can be said to be fairly rich. This abundance is an indirect indication of good productivity of the estuary. Local fishermen depend upon these resources next to fin fisheries for their livelihood. Forms such as *Perna viridis* (Linnaeus, 1758), *Crassostrea cuttackensis* (Newton and Smith, 1912) and *Meretrix meretrix* (Linnaeus, 1758) chiefly contribute to the molluscan fishery and provide an economical and good source of protein to people. Shells of many bivalves and gastropods

Table 1: Checklist of molluscan fauna of Bahuda estuary

Class	Order	Family	Species	
Gastropoda	Archaeogastropoda	Trochidae	<i>Umbonium vestiarium</i> (Linnaeus, 1758)	
		Mesogastropoda	Littorinidae	<i>Littoraria (Littoraria) undulata</i> (Gray, 1839)
	Neogastropoda	Potamididae		<i>Cerithidea (Cerithideopsilla) cingulata</i> (Gmelin, 1791)
				<i>Telescopium telescopium</i> (Linnaeus, 1758)
			Naticidae	<i>Natica vitellus</i> (Linnaeus, 1758)
				<i>Natica gualteriana</i> Recluz, 1844
				<i>Polinices (Polinices) tumidus</i> (Swainson, 1840)
			Tonnidae	<i>Tonna dolium</i> (Linnaeus, 1758)
			Ficidae	<i>Ficus variegata</i> Roeding, 1798
				<i>Ficus gracilis</i> (Sowerby, 1825)
			Bursidae	<i>Bufo naria rana</i> (Linnaeus, 1758)
			Muricidae	<i>Murex tribulus</i> (Linnaeus, 1758)
			Babyloniidae	<i>Babylonia spirata</i> (Linnaeus, 1758)
			Nassariidae	<i>Bullia vittata</i> (Linnaeus, 1767)
			Olividae	<i>Oliva oliva</i> (Linnaeus, 1758)
				<i>Olivancillaria gibbosa</i> (Born, 1778)
Bivalvia	Arcoida	Conidae	<i>Conus inscriptus</i> Reeve, 1843	
		Terebridae	<i>Terebra commaculata</i> (Gmelin, 1791)	
		Arcidae	<i>Anadara granosa</i> (Linnaeus, 1758)	
	Mytiloidea		<i>Anadara rhombea</i> (Born, 1780)	
			<i>Perna viridis</i> (Linnaeus, 1758)	
		Pterioidea	<i>Placuna placenta</i> Linnaeus, 1758	
			<i>Crassostrea cuttackensis</i> (Newton and Smith, 1912)	
		Veneroidea	Ostreidae	<i>Siliqua radiata</i> (Linnaeus, 1758)
			Cultellidae	<i>Donax (Hecuba) scortum</i> (Linnaeus, 1758)
			Donacidae	<i>Sunetta scripta</i> (Linnaeus, 1758)
	Veneridae	<i>Meretrix meretrix</i> (Linnaeus, 1758)		

in this area are exploited for lime preparation and ornamental / decorative purposes. In view of good abundance of molluscs during the present limited work, further survey(s) are likely to bring to light more species that have not so far been recorded from this region and understand the biodiversity better.

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14. *CROTALARIA ANGULATA* MILLER AND *TAXILLUS BRACTEATUS* (WALL.) TIEGHEM – NEW RECORDS TO THE FLORA OF ORISSA

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Introduction

In the course of phytosociological studies of Similipal Biosphere Reserve, Mayurbhanj district, Orissa, India, we collected specimens of two interesting species. After critical examination (Gamble and Fischer 1915-1936) and examining the specimens deposited at Linnaean Herbarium (S-LINN), Swedish Museum of Natural History (Anon 2002) and Central National Herbarium (CAL), Kolkata, they were identified as *Crotalaria angulata* Miller (Papilionaceae) and *Taxillus bracteatus* (Wall.) Tieghem. (Loranthaceae). They are not mentioned in the flora of Orissa (Saxena and Brahmam 1996; Mishra *et al.* 1999), and are first time records from here.

Crotalaria angulata Miller (Papilionaceae)

Crotalaria angulata Miller, Gard. Dict. ed.8. no.9. 1768. *Astragalus biflorus* L. Mant. Pl. 273. 1771. *Crotalaria biflora* (L.) L. Mant. Pl. 570. 1771: FBI 2: 66. 1876; Gamble 1: 292 (206) 1918.

Prostrate herb. Branchlets hispid. Leaves simple, ovate. 1.0-1.6 x 0.4-1.0 cm, base and apex obtuse, margin entire. Racemes lateral, 2-flowered. Corolla exerted, yellow. Pod subglobose, 1.0 x 0.8 cm, stiff-hispid, twice as long as calyx. Seeds 8-10.

Habitat: Rare, in fringes of Sal dominated moist deciduous forests (elevation: 800 m).

Fl. & Fr.: August-February.